Graph Theory

graph - set of things (points, vertices)
2 related to each other (edge connecting the 2 things)

Def: A graph $G$ is a pair $(V, E)$ where $V$ is a finite set of vertices and $E$ is a set of 2 element subsets of $V$. A 2 element subset $\{u, v\}$ is called an edge connecting the vertices $u \in V$, $v \in V$

- graph $G$ can't have this subset w/ element more than once

Directed graph (digraph)
ordered pair $(u, v)$

(the picture's not the graph)

A graph is planar if you can draw it w/o any edges crossing

Graph isomorphism problem
$V(G)$, $E(G)$ multiple graphs

Def. the order of $G$ is the # of elements (cardinality) of $V$ (|V|)
The size of $G$ is $1E1$
$$n \binom{n-1}{2} = \binom{n}{2}$$ for max # edges (size) where $n$ is the order

Directed graph $D(n-1)$
$\{u, v\}$ edge "uv"
If there's an edge say $u \in V$ adjacent
$u$ is incident with $\{u, v\}$

The degree of $v$ is the # of edges that contain $v$
$\Delta(G)$: max degree $\Delta(G)$ min degree